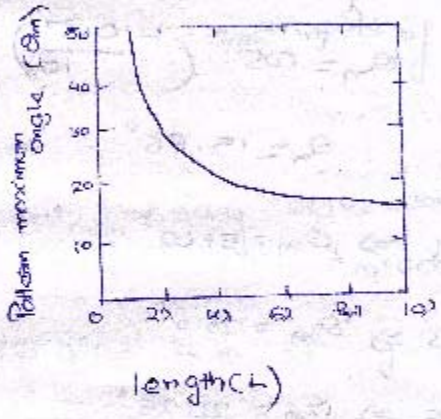
Antenna Theory and Design

Homework - 15

7.2-2) Compare the approximate beam maximum angle formula of (7-7) for a travelling wave long wire with values of Fig 7-4 for $\frac{L}{\lambda} = 1, 3, 6, 10$



Sol:- We have

$$\theta_m = \cos^{-1}\left(1 - \frac{0.371}{\frac{L}{\lambda}}\right)$$

i) $\frac{L}{\lambda} = 1 \Rightarrow L = \lambda$

So $\theta_m = \cos^{-1}\left(1 - \frac{0.371}{\frac{L}{L}}\right)$

$= 51.02^\circ$

ii) $\frac{L}{\lambda} = 3 \Rightarrow L = 3\lambda$

$\theta_m = \cos^{-1}\left(1 - \frac{0.371}{3\frac{\lambda}{\lambda}}\right)$

$$\theta_m = \cos^{-1}\left(1 - \frac{0.371}{3}\right)$$

$$= 28.8^\circ$$

for $\frac{L}{\lambda} = 6$

$$\theta_m = \cos^{-1}\left(1 - \frac{0.371}{6}\right)$$

$$= 20.25^\circ$$

for $\frac{L}{\lambda} = 10$

$$\theta_m = \cos^{-1}\left(1 - \frac{0.371}{10}\right)$$

$$\theta_m = 15.66^\circ$$

$\frac{L}{\lambda} = 1 \Rightarrow \theta_m = 51.02^\circ$

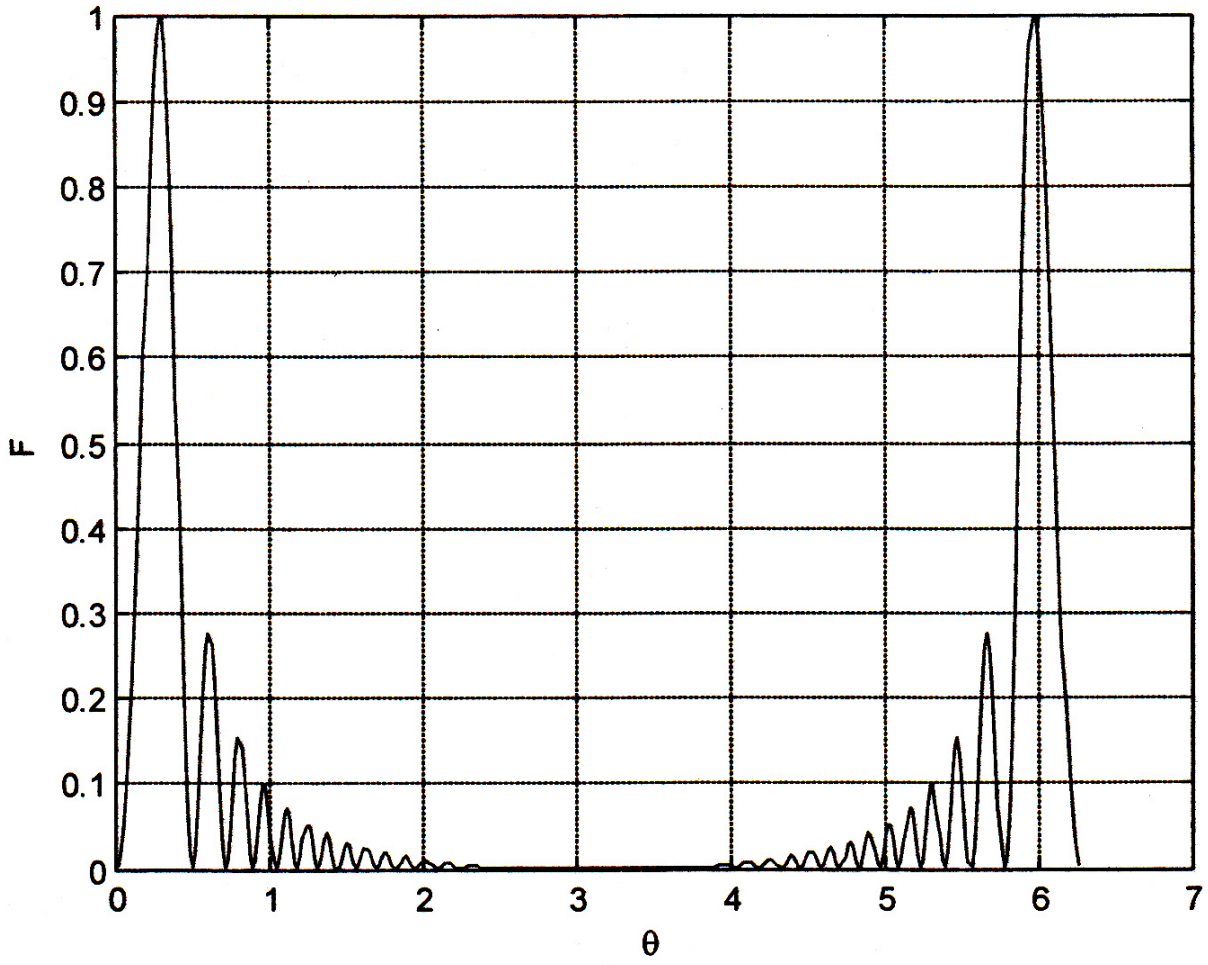
$\frac{L}{\lambda} = 3 \Rightarrow \theta_m = 28.8^\circ$

$\frac{L}{\lambda} = 6 \Rightarrow \theta_m = 20.25^\circ$

$\frac{L}{\lambda} = 10 \Rightarrow \theta_m = 15.66^\circ$

12-6) Plot the linear, polar plot of a traveling-wave long wire antenna that is eight wavelengths long

Sol) The Linear plot of travelling wave antenna which is 8λ is shown below:



The polar plot of travelling wave antenna which is 8λ is shown below: